

1.  $\sin t \csc t = 1$
2.  $\sec y \cos y = 1$
3.  $(1 + \sin \alpha)(1 - \sin \alpha) = \cos^2 \alpha$
4.  $\cot^2 y (\sec^2 y - 1) = 1$
5.  $\cos^2 \beta - \sin^2 \beta = 1 - 2 \sin^2 \beta$
6.  $\cos^2 \beta - \sin^2 \beta = 2 \cos^2 \beta - 1$
7.  $\tan^2 \theta + 4 = \sec^2 \theta + 3$
8.  $2 - \sec^2 z = 1 - \tan^2 z$
9.  $\sin^2 \alpha - \sin^4 \alpha = \cos^2 \alpha - \cos^4 \alpha$
10.  $\cos x + \sin x \tan x = \sec x$
11.  $\frac{\csc^2 \theta}{\cot \theta} = \csc \theta \sec \theta$
12.  $\frac{\cot^3 t}{\csc t} = \cos t (\csc^2 t - 1)$
13.  $\frac{\cot^2 t}{\csc t} = \csc t - \sin t$
14.  $\frac{1}{\tan \beta} + \tan \beta = \frac{\sec^2 \beta}{\tan \beta}$
15.  $\sin^{1/2} x \cos x - \sin^{5/2} x \cos x = \cos^3 x \sqrt{\sin x}$
16.  $\sec^6 x (\sec x \tan x) - \sec^4 x (\sec x \tan x) = \sec^5 x \tan^3 x$
17.  $\frac{\sec x \tan x}{1} = \csc x - \sin x$
18.  $\frac{\sec \theta - 1}{1 - \cos \theta} = \sec \theta$
19.  $\cot \alpha + \tan \alpha = \csc \alpha \sec \alpha$
20.  $\sec x - \cos x = \sin x \tan x$
21.  $\frac{1}{\tan x} + \frac{\cot x}{1} = \tan x + \cot x$
22.  $\frac{\sin x}{1} - \frac{\csc x}{1} = \csc x - \sin x$
23.  $\frac{\cos \theta \cot \theta}{1 - \sin \theta} - 1 = \csc \theta$
24.  $\frac{1 + \sin \theta}{\cos \theta} + \frac{1 + \sin \theta}{\cos \theta} = 2 \sec \theta$
25.  $\frac{1}{\sin x + 1} + \frac{1}{\csc x + 1} = 1$
26.  $\cos x - \frac{1 - \tan x}{\sin x \cos x} = \frac{1 - \tan x}{\sin x - \cos x}$
27.  $\csc^4 \theta - \cot^4 \theta = 2 \csc^2 \theta - 1$
28.  $\sec^4 \theta - \tan^4 \theta = 1 + 2 \tan^2 \theta$
29.  $\csc^4 \theta - \cot^4 \theta = 2 \csc^2 \theta - 1$
30.  $(1 + \sin y)[1 + \sin(-y)] = \cos^2 y$
31.  $\frac{\sin x \cos y + \cos x \sin y}{\tan x + \tan y} = \frac{\cos x \cos y - \sin x \sin y}{1 - \tan x \tan y}$
32.  $\frac{\tan x + \tan y}{1 - \tan x \tan y} = \frac{\cot x + \cot y}{\cot x \cot y - 1}$
33.  $\frac{\tan x + \cot y}{\tan x \cot y} = \tan y + \cot x$
34.  $\frac{\sin x + \sin y}{\cos x - \cos y} + \frac{\sin x + \sin y}{\cos x + \cos y} = 0$
35.  $\sqrt{\frac{1 + \sin \theta}{1 - \sin \theta}} = \frac{1 + \cos \theta}{1 - \cos \theta} = \frac{1 + \cos \theta}{|\sin \theta|}$
36.  $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} = \frac{1 + \cos \theta}{|\sin \theta|}$
37.  $\cos^2 \beta + \cos^2 \left( \frac{\pi}{2} - \beta \right) = 1$
38.  $\sec^2 y - \cot^2 \left( \frac{\pi}{2} - y \right) = 1$
39.  $\sin t \csc \left( \frac{\pi}{2} - t \right) = \tan t$
40.  $\sec^2 \left( \frac{\pi}{2} - x \right) - 1 = \cot^2 x$



In Exercises 41-52, use a graphing utility to determine whether the equation is an identity. If it is, confirm it algebraically.

41.  $2 \sec^2 x - 2 \sec^2 x \sin^2 x - \sin^2 x - \cos^2 x = 1$
42.  $\csc x (\csc x - \sin x) + \frac{\sin x}{\sin x - \cos x} + \cot x = \csc^2 x$
43.  $2 + \cos^2 x - 3 \cos^4 x = \sin^2 x (3 + 2 \cos^2 x)$
44.  $\tan^4 x + \tan^2 x - 3 = \sec^2 x (4 \tan^2 x - 3)$
45.  $\csc^4 x - 2 \csc^2 x + 1 = \cot^4 x$
46.  $(\sin^4 \beta - 2 \sin^2 \beta + 1) \cos \beta = \cos^5 \beta$
47.  $\sec^4 \theta - \tan^4 \theta = 1 + 2 \tan^2 \theta$
48.  $\csc^4 \theta - \cot^4 \theta = 2 \csc^2 \theta - 1$